Bell Work

1. Find the equation of a line in slope-intercept form that has a slope of -5/6 and goes through (-12, 5).

2. Find the value of the function f(-3). $f(x) = x^2 - 2x + 4$

3. What are the 3 things needed to write a linear equation?

4. Is this number relationship a function?

x	-4	-2	0	2	4
y	5	3	5	3	5

Today, you will find linear equations of parallel and perpendicular lines.

$$y = \frac{3}{2}x - 16$$

$$y = \frac{1}{4}x - \frac{15}{4}$$

$$y = \frac{3}{5}x - 3$$

$$y = \frac{1}{2}x - \frac{3}{2}$$

Find the equation of a <u>parallel</u> line to $y = 3/5\ x + 2$ and goes through (10, 3).

Parallel lines have the same slope.

Point-Slope Formula:

$$y - y_1 = m(x - x_1)$$

$$y - 3 = \frac{3}{5}(x - 10)$$

$$y - 3 = \frac{3}{5}x - 6$$

$$\underline{+\ 3 \qquad\qquad +\ 3}$$

$$y = \frac{3}{5}x - 3$$

Find the equation of a <u>parallel</u> line to $y = $ -3/2 $x - 5$ and goes through (-5, 7).

Parallel lines have the same slope.

Point-Slope Formula:

$$y - y_1 = m(x - x_1)$$

$$y - 7 = -\frac{3}{2}(x + 5)$$

$$y - 7 = -\frac{3}{2}x - \frac{15}{2}$$

$$\underline{+7 \qquad\qquad\qquad +7}$$

$$y = -\frac{3}{2}x - \frac{1}{2}$$

Find the equation of a <u>parallel</u> line to $y = 1/4\ x - 6$ and goes through (3, -3).

Parallel lines have the same slope.

Point-Slope Formula:

$$y - y_1 = m(x - x_1)$$

$$y + 3 = \frac{1}{4}(x - 3)$$

$$y + 3 = \frac{1}{4}x - \frac{3}{4}$$

$$\underline{-3 \qquad\qquad -3}$$

$$y = \frac{1}{4}x - \frac{15}{4}$$

Find the equation of a perpendicular line to $y = 3/4$ $x + 4$ **and goes through (6, -3).**

Perpendicular lines have the opposite, reciprocal slope.

Flip and Switch

Point-Slope Formula:

$$y - y_1 = m(x - x_1)$$

$$y + 3 = -\frac{4}{3}(x + 6)$$

$$y + 3 = -\frac{4}{3}x - 8$$

$$\underline{-3 \qquad\qquad -3}$$

$$y = -\frac{4}{3}x - 11$$

Find the equation of a perpendicular line to $y = -2x - 5$ **and goes through (5, 1).**

Perpendicular lines have the opposite, reciprocal slope.

Flip and Switch

Point-Slope Formula:

$$y - y_1 = m(x - x_1)$$

$$y - 1 = \frac{1}{2}(x - 5)$$

$$y - 1 = \frac{1}{2}x - \frac{5}{2}$$

$$\underline{+1 \qquad\qquad +1}$$

$$y = \frac{1}{2}x - \frac{3}{2}$$

Find the equation of a <u>perpendicular</u> line to $y = -2/3\ x - 9$ and goes through (8, -4).

Perpendicular lines have the opposite, reciprocal slope.

Flip and Switch

Point-Slope Formula:

$$y - y_1 = m(x - x_1)$$

$$y + 4 = \frac{3}{2}\ (x - 8)$$

$$y + 4 = \frac{3}{2}x - 12$$

$$\underline{-4 \qquad\qquad -4}$$

$$y = \frac{3}{2}x - 16$$

Determine if the pair of lines are parallel, perpendicular, or neither.

$$y = \frac{4}{3}x - 3 \quad \& \quad \overset{A}{3x} + \overset{B}{4}\overset{C}{y} = 1$$

$$\text{Slope}: \quad \frac{4}{3} \qquad -\frac{A}{B} = -\frac{3}{4}$$

Are they the same? No

Are they opposite, reciprocals? Yes

Perpendicular

Determine if the pair of lines are parallel, perpendicular, or neither.

$$2x - 3y = -12 \quad \& \quad -6x + 9y = -21$$

Slope : $\quad -\dfrac{A}{B} = -\dfrac{2}{-3} = \dfrac{2}{3} \qquad -\dfrac{A}{B} = -\dfrac{-6}{9} = \dfrac{2}{3}$

Are they the same?   Yes

Parallel

Determine if the pair of lines are parallel, perpendicular, or neither.

$$4x - y = 6 \quad \& \quad x - 4y = 8$$

Slope : $\quad -\dfrac{A}{B} = -\dfrac{4}{-1} = \dfrac{4}{1} \qquad -\dfrac{A}{B} = -\dfrac{-1}{4} = \dfrac{1}{4}$

Are they the same?   No

Are they opposite, reciprocals?   No

Neither

Write the linear function with the given values.

$$f(4) = 3 \quad \& \quad f(-2) = 6$$

$$(4, 3) \ \& \ (-2, 6)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{6 - 3}{-2 - 4} = \frac{3}{-6} = -\frac{1}{2}$$

$$y - y_1 = m(x - x_1)$$

$$y - 3 = -\frac{1}{2}(x - 4)$$

$$y - 3 = -\frac{1}{2}x + 2$$

$$\underline{+ 3 \qquad\qquad\qquad + 3}$$

$$y = -\frac{1}{2}x + 5$$

$$f(x) = -\frac{1}{2}x + 5$$

Write the linear function with the given values.

$$f(-3) = 4 \quad \& \quad f(1) = -6$$

$$(-3, 4) \quad \& \quad (1, -6)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{4 - -6}{-3 - 1} = \frac{10}{-4} = -\frac{5}{2}$$

$$y - y_1 = m(x - x_1)$$

$$y - 1 = -\frac{5}{2}(x + 3)$$

$$y - 1 = -\frac{5}{2}x - \frac{15}{2}$$

$$\underline{+1 \qquad\qquad\quad +1}$$

$$y = -\frac{5}{2}x - \frac{13}{2}$$

$$f(x) = -\frac{5}{2}x - 13$$

What do you know about parallel lines?

They have the same slope.

What do you know about perpendicular lines?

They have the opposite, reciprocal slope.

Flip and Switch

Assignment:

Page 120 # 10, 11, 20, 21, 23 – 27, 44 – 46

Write the equation of each line in slope-intercept form.

10. parallel to $y = 3x + 4$ passing through $(0, 9)$

11. perpendicular to $y = \frac{5}{9}x + 4$ passing through $(0, -4)$

20. parallel to $y = -\frac{1}{5}x - 7$ and through $(2, 3)$

21. perpendicular to $y = 3x$ and through $(0, 3)$

Determine if each pair of lines is parallel, perpendicular, or neither.

23. $y = \frac{1}{4}x + 9$
$y = 4x - 9$

24. $y = 5 - \frac{1}{8}x$
$y = 8x + 2$

25. $-3x + 4y = 15$
$9x - 12y = 24$

Write each linear function.

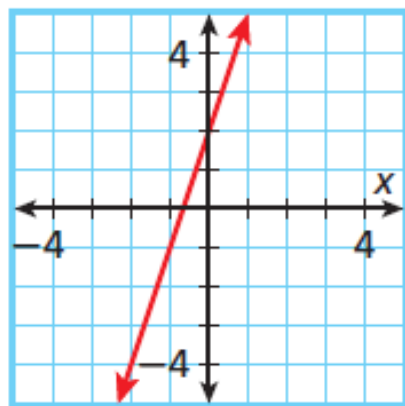**26.** $f(x)$, where $f(3) = 3$ and $f(-1) = 4$

27. $f(x)$, where $f(-2) = -5$ and $f(1) = 1$

44. A carpenter determines the cost of a job by using the formula $C = 25 + 25h$, where h is the number of hours he works. He has decided to increase the amount he charges per hour to $30. Which formula will he use now?
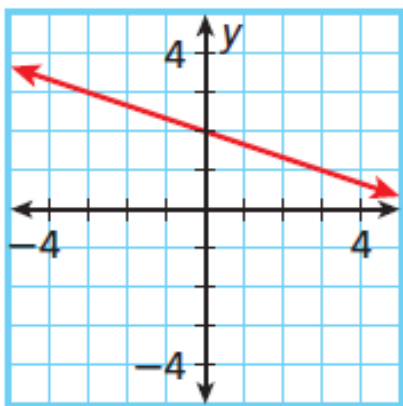
Ⓐ $C = 30 + 25h$ Ⓑ $C = 30 + 30h$ Ⓒ $C = 25 + 30h$ Ⓓ $C = 25h + 30$

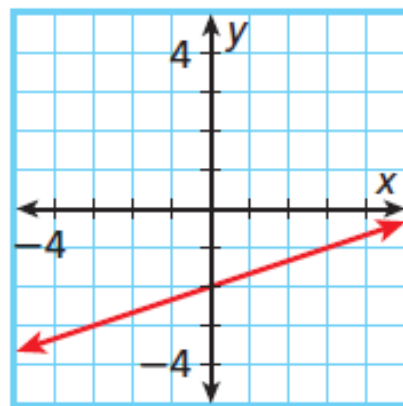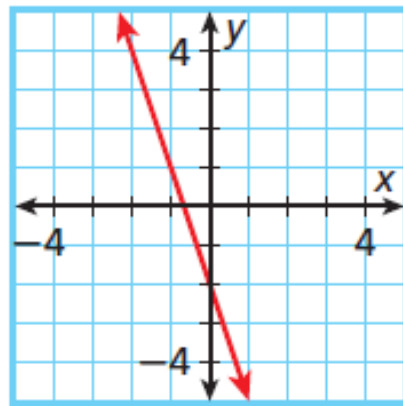**45.** Which graph best shows a line perpendicular to $y = 3x - 2$?

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46. An equation can be used to relate the cost c of carpeting a room to the area a of the room in square feet. Which equation accurately reflects the data in the table?

Ⓐ $c = 2a - 125$ Ⓒ $c = a + 275$

Ⓑ $c = 1.5a + 75$ Ⓓ $c = 2a - 1500$

Carpeting Costs	
Area (ft²)	Cost ($)
400	675
550	900
900	1425